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Objection

Re: Draft Protective Action Guides for Radionuclides in Drinking Water

(Docket Number (EPA-HQ-OAR-2007-0268; FRL-9947-55-OW) FR 81:112 page 37589-37592, June 10, 2016)

Hon. Gina McCarthy & PEER Members *Listed in the July 25, 2016 letter to the EPA @*

www.peer.org/assets/docs/7-26-63OrganizationsPAGsComments.pdf

In support of PEER's comments, I hereby object to your Agency's PAG notice as published in the 6/10/16 Federal Register with this false claim: "***The proposed PAG is designed to work in concert with the other Protective Action Guides currently in place for other media in the intermediate phase (i.e., the Food and Drug Administration's 500 mrem PAG for ingestion of food) and provides an additional level of protection for the most sensitive life stages.***"

First, the FDA has no Alpha, Beta or Gamma MCLs for bottled radioactive water or beverages.

Second, as illustrated in Exhibit A, your Agency's **Sum-of-the-Fractions** method indicates doses to teenagers & adults will exceed **500 mrem/yr** if they drink only 2 liters/day of water containing a fraction of the proposed PAG concentrations for Sr-90, I-131, Cs-137. In fact, if their decay products are included, the dose to thousands of people could exceed the current MCL of **4 mrem/yr** by over **18,320 mrem/yr (0.183 Sv/yr)**, as illustrated in Table I.

Table I: Sum-of-the-Fractions Method Indicates Worst Case Doses Can Exceed 500 mrem/yr (5 mSv/yr)

Emitter	(X) Proposed PAG Concentration (pCi/L)	(Y) Dose Conversion Factor (pCi/4mrem)	(XY = A) Calculated Fraction	(A*4) Calculated Total mrem	Half-Life
Strontium-90 (Sr-90)	7,400	8	925	3,700	28.79 yr
Yttrium-90 (Y-90)	7,400 (T>20 days)	60	123.3	493.2	2.761 d
Iodine-131 (I-131)	10,350	3	3,450	13,800	8.023 d
Xenon-131m (Xn-131m)	75.5 (T=10 days)	n/a	n/a	n/a	11.93 d
Cesium-137 (Cs-137)	16,570	200	82.85	331.4	30.04 yr
Barium-137m (Ba-137m)	15,642 (T>20 min)	n/a	n/a	n/a	2.552 min
Sum-of-the-Fractions			>4,581	>18,324	>183.24 mSv/yr
Gross Beta	57,438 pCi/L	MCL Exceedance		>18,320 mrem/yr	>183.2 mSv/yr

NY State Officials Cannot Be Trusted

Contrary to EPA-propaganda cited in Footnote # 1, my water quality reports indicate corrupt NY State officials cannot be trusted to use the Sum-of-the Fractions Method ² in the event of an emergency to determine when alternative drinking water should be provided and the use of contaminated water supplies should be restricted. Consequently, thousands of men, women & children could be ingesting atomic-energy doses far in excess of **500 mrem/yr**. Exhibits A-I indicate the proponents of this heinous scam failed to use modern analysis tools like Nucleonica to estimate radiation doses delivered by 2 liters per day of water that may contain dozens of fission products in addition to dozens of naturally occurring radionuclides having no proposed PAG values, as discussed in the pending PEER lawsuit cited in Footnote #3.

Many corrupt state & county health departments, including mine, have never imposed the Sum-of-the-Fractions method on any public water company, despite numerous complaints to EPA, state & county officials.

Fraudulent Use of EPA Method 900 Alters Test Samples To Suppress In-growth

Water quality reports @ www.scwa.com, www.gfxtechnology.com/Radon.html, www.gfxtechnology.com/SCL.pdf, www.gfxtechnology.com/CCE.pdf contain false Gross Alpha & Gross Beta test results obtained by EPA Method 900, which can suppress in-growth of decay products from both man-made & naturally occurring radionuclides dissolved in tap or bottled water. For example, as shown in the enclosed graphs for Cs-137 & Sr-90, total activity quickly exceeds the initial activity of either a parent after being dissolved in water. (See other graphs @ www.gfxtechnology.com/1-Ci.pdf)

Therefore, you must reject the proposed PAGs and add MCLs for Radon gases to the Safe Drinking Water Act as Congress ordered decades ago. [**Radon in Drinking Water Rule**, Federal Register on November 2, 1999 (64 FR 59246)]

Yours truly,

Dr. Carmine F. Vasile

¹ At what point and what concentrations will I be told to stop drinking tap water during a radiological emergency?

State and local officials will make decisions about continued use of tap water based upon the conditions on-site during a **radiological emergency**. The proposed drinking water PAG provides information they will consider, including two scientifically-based levels to be avoided (100 mrem for infants, children aged 15 and under, pregnant women and nursing women; **500 mrem for anyone over age 15** excluding pregnant women and nursing women) for periods up to one year. Since this is only guidance, the levels selected by your state or local officials will depend on the type and severity of the incident. You may not be instructed to stop drinking tap water. Your water department—in coordination with state/local officials and emergency managers—may choose to either use water from storage tanks that have not been impacted by radiation, purchase water from a neighboring town, transport water in tanker trucks or provide [unregulated, radioactive] bottled water to the community. (From: <https://www.epa.gov/radiation/proposed-drinking-water-protective-action-guide-pag-radiological-emergencies-information>)

² See EPA ILLUSTRATION II-1 "Conversion of Beta Particle and Photon Emitters" @ <https://nepis.epa.gov/Exe/ZyPDF.cgi/P1009DJN.PDF?Dockey=P1009DJN.PDF>.

³ See PEER Lawsuit @ http://www.peer.org/assets/docs/epa/10_24_16_Complaint_EPA-radionuclides.pdf.

Exhibit A: Erroneous example of “Sum-of-the-Fractions” method mandated by the EPAs Radionuclides Rule to determine if a public water system is in compliance with the 4 mrem/yr MCL for beta particle and photon radioactivity (40 CFR 141.66(d))^{4,5}.

**ILLUSTRATION II-1
Conversion of Beta Particle and Photon Emitters**

A water system near a nuclear power facility collects a sample which the laboratory speciates by EPA method 902.0 (gamma spectrometry analysis). The laboratory also analyses for strontium-90 using EPA method 905.0. The analysis indicates the following:

Cesium-134 (Cs-134): 5.023 pCi/L
 Cesium-137 (Cs-137): 30 pCi/L
 Strontium-90 (Sr-90): 4 pCi/L
 Iodine-131 (I-131): 2 pCi/L

To determine compliance the following calculations are completed:

Emitter	(X) Lab Analysis (pCi/L)	(Y) Conversion from table (pCi/4mrem)	(X/Y=A) Calculated Fraction ¹	(A*4) Calculated Total mrem ²
Cs-134	5,023	20,000	0.25115	
I-131	2	3	0.7	
Cs-137	30	200	0.150	
Sr-90	4	8	0.5	
Sum-of-the-fractions			1.60115	7

¹To ensure accuracy, the results were rounded to the number of figures in the conversion table. See Appendix I.

²Since data reported to the State or EPA should be in a form containing the same number of significant digits as the MCL, the results were rounded to one significant digit. The last significant digit was increased by one unit if the digit dropped was a 5, 6, 7, 8, or 9; and was not altered if the preceding number was a 0, 1, 2, 3, or 4.

The system is in violation of the MCL because the “sum-of-the-fractions” is 7 mrem, which means that the sum of the annual dose equivalent to the total body, or to any internal organ, exceeds 4 mrems/year.

From: EPA Implementation Guidance for Radionuclides, Page II-2 @
<https://nepis.epa.gov/Exe/ZyPDF.cgi/P1009DJN.PDF?Dockey=P1009DJN.PDF>

Exhibit B. Corrected version of Table A using Cs-134m; parent of Cs-134.

Emitter	(X) Lab Analysis (pCi/L)	(Y) Conversion from Table (pCi/4mrem)	(X/Y = A) Calculated Fraction	(A*4) Calculated Total mrem	Half-Life
Cs-134m	5,023	20,000	0.25115		2.908 hr
I-131	2	3	0.7		8.023 d
Cs-137	30	200	0.15		30.04 yr
Sr-90	4	8	0.5		28.79 yr
Sum-of-the-Fractions			1.6015	7	.07 mSv/yr
Gross Beta	5,059 pCi/L	MCL Exceedance		3 mrem/yr	0.03 mSv/yr

⁴ To determine compliance, each beta and photon emitter must be converted from pCi/L to millirems using the conversion tables listed in “*Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure*” [National Bureau of Standards (NBS) Handbook 69 as amended August, 1963, U.S. Department of Commerce and/or *Radionuclides in Drinking Water: A Small Entity Compliance Guide*; pg 13 @ <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=20001ZIN.txt>]

⁵ Each Curie of ingested Alpha radiation delivers 20 times the atomic energy of a Curie of Beta or Photon radiation. One Joule per Kilogram = 1 Sievert (Sv) = 100 Rem

**Exhibit C. Modified version of Table B
including time-dependant radioactive decay products.***

Parent Emitter	Lab Analysis of Parents (pCi/L)	Radioactive Decay Products	Calculated Fraction of Parent Activity Using Nucleonica
Cs-134m	5,023	Cs-134	1.58e-3 (after 10 hours of in-growth)
I-131	2	Xn-131m gas	7.29e-3 (after 10 days of in-growth)
Cs-137	30	Ba-137m	0.944 (after 20 min of in-growth)
Sr-90	4	Y-90	1.00 (after 20 days of in-growth)

Emitter	(X) Lab & Nucleonica Analysis (pCi/L)	(Y) Conversion from Table (pCi/4mrem)	(X/Y = A) Calculated Fraction	(A*4) Calculated Total mrem	Half-Life
Cs-134m	5,023	20,000	0.25115		2.908hr
Cs-134	7.94 (T=10 hr)	80	0.09925	0.397	2.065 yr
I-131	2	3	0.7		8.023 d
Xn-131m	0.0146 (T=10 days)	n/a	n/a	n/a	11.93 d
Cs-137	30	200	0.15		30.04 yr
Ba-137m	28.3 (T>20 min)	n/a	n/a	n/a	2.552 min
Sr-90	4	8	0.5		28.79 yr
Y-90	4 (T>20 days)	60	0.0667	0.2668	2.761 d
Sum-of-the-Fractions			>2.26495	>9	>0.09 mSv/yr
Gross Beta	5,071 pCi/L	MCL Exceedance		>9 mrem/yr	>0.09 mSv/yr

* Decay product Activity & Half-Life values from tables @ www.gfxtechnology.com/1-Ci.pdf.

**Exhibit D. Modified version of Table C corresponding to Water-PAG concentrations proposed by President Obama
for I-131, Cs-137 & Sr-90, which excluded ingested radiation doses from their highly radioactive decay products:
Xn-131m, Ba-137m & Y-90, respectively.**

Emitter	Lab Analysis (pCi/L)	Radioactive Decay Products	Calculated Fraction of Parent Activity Using Nucleonica
Cs-134	5,023	None	n/a
I-131	10,350	Xn-131m gas	0.64e-3 (after 1 day of in-growth) 7.29e-3 (after 10 days of in-growth)
Cs-137	16,370	Ba-137m	0.944 (after 20 min of in-growth)
Sr-90	7,400	Y-90	1.00 (after 20 days of in-growth)

Emitter	(X) Lab Analysis (pCi/L)	(Y) Conversion from Table (pCi/4mrem)	(X/Y = A) Calculated Fraction	(A*4) Calculated Total mrem	Half-Life
Cs-134	n/a	20,000	n/a		2.908 hr
Cs-134m	n/a	80	n/a		2.065 yr
I-131	10,350	3	3,450		8.023 d
Xn-131m	75.5 (T=10 days)	n/a	n/a		11.93 d
Cs-137	16,570	200	82.85		30.04 yr
Ba-137m	15,642 (T>20 min)	n/a	n/a		2.552 min
Sr-90	7,400	8	925		28.79 yr
Y-90	7,400 (T>20 days)	60	123.3		2.761 d
Sum-of-the-Fractions			>4,581	>18,324	>183.24 mSv/yr
Gross Beta	57,438 pCi/L	MCL Exceedance		>18,320 mrem/yr	>183.2 mSv/yr

Exhibit E. Nucleonica Analysis of 1-Ci of Sr-90

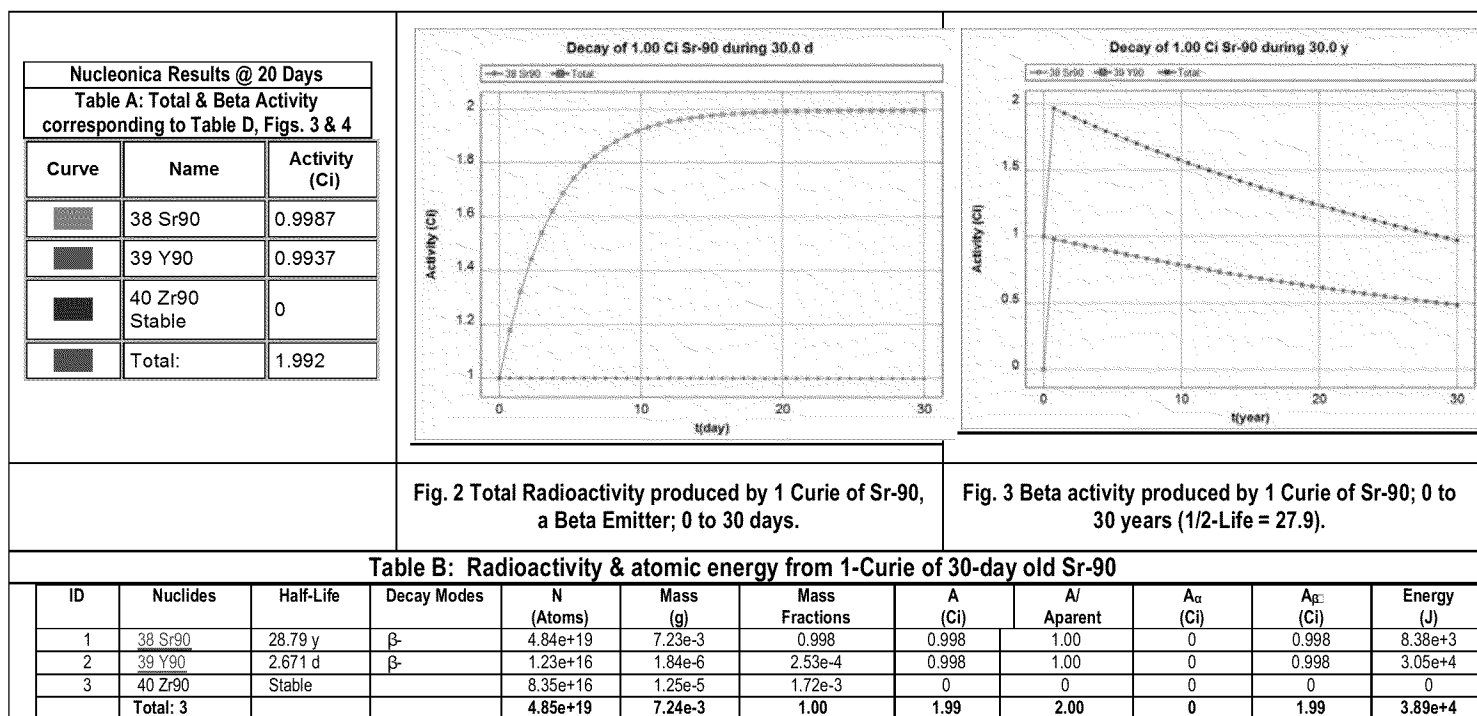


Exhibit F. Nucleonica Analysis of 1-Ci of I-131

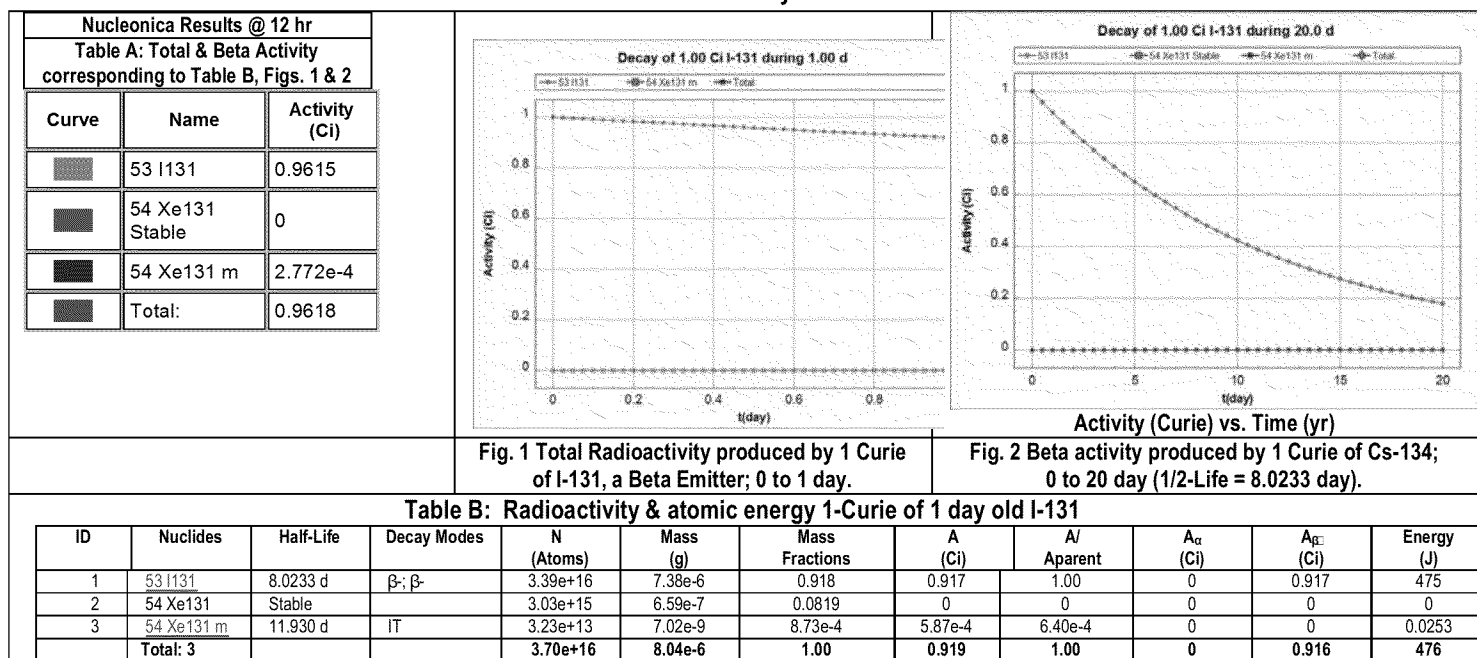


Exhibit G. Nucleonica Analysis of 1-Ci of Cs-134m

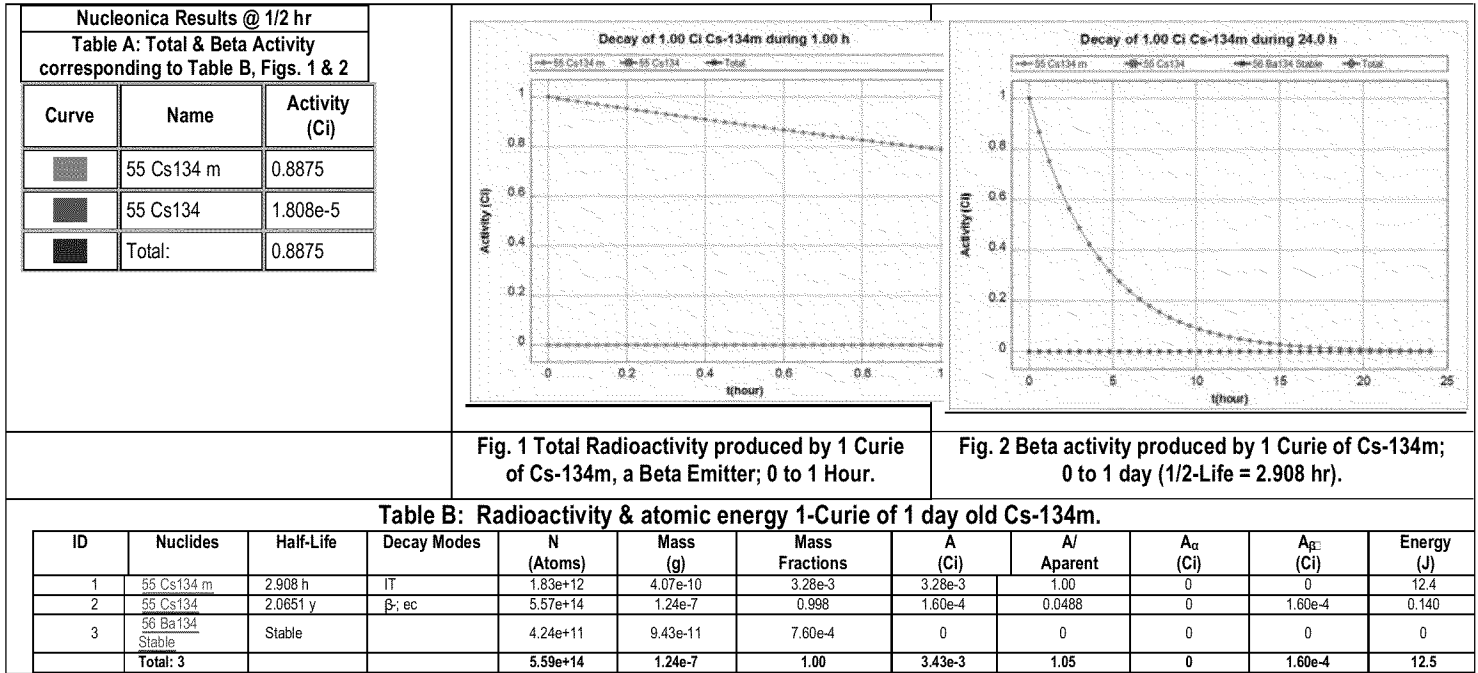


Exhibit H. Nucleonica Analysis of 1-Ci of Cs-134

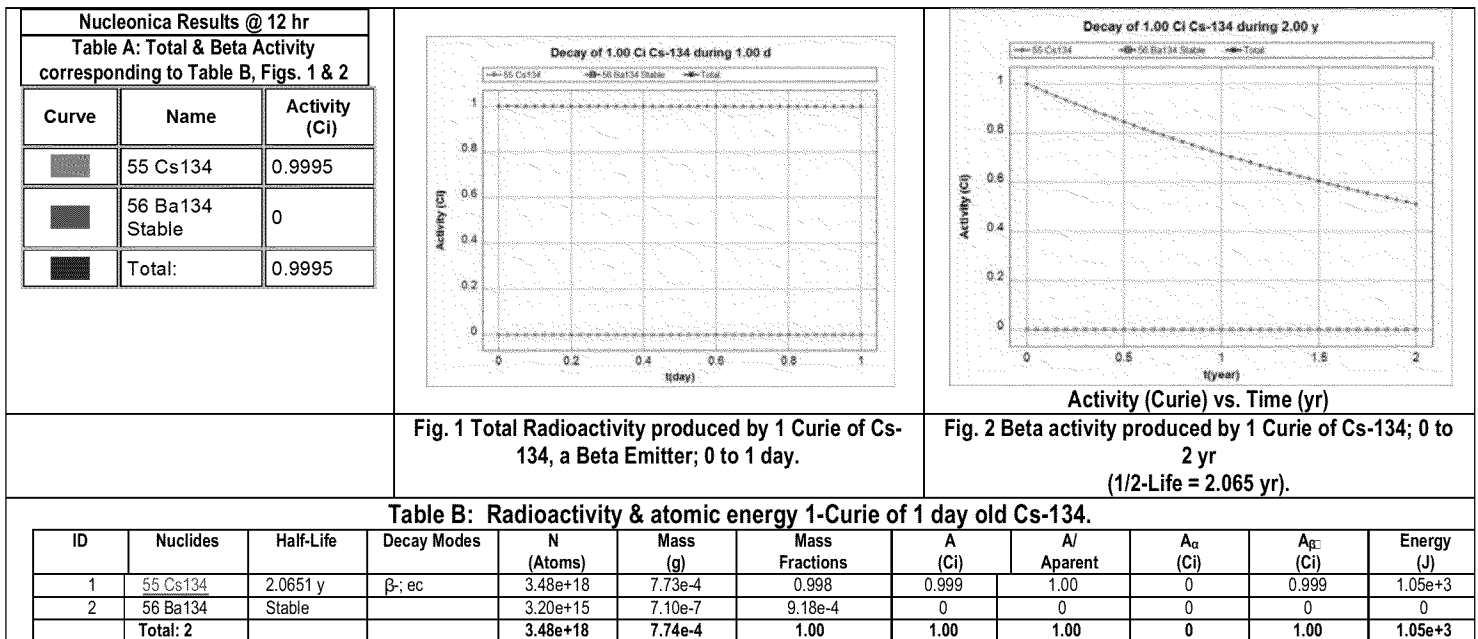
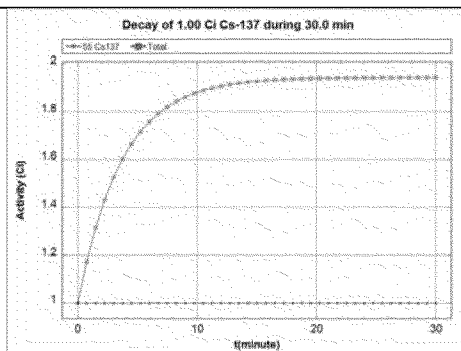


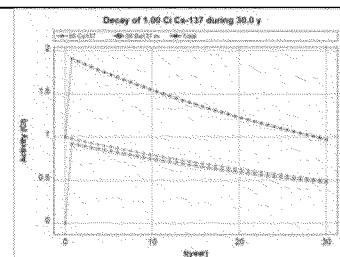
Exhibit I. Nucleonica Analysis of 1-Ci of Cs-137

Nucleonica Results @ 20 Minutes		
Table A: Total & Beta Activity corresponding to Table B, Figs. 1 & 2		
Curve	Name	Activity (Ci)
	55 Cs137	1.000
	56 Ba137 m	0.9398
	56 Ba137 Stable	0
	Total:	1.940



Activity (Curie) vs. Time (yr)

Fig. 1 Total Radioactivity produced by 1 Curie of Cs-137, a Beta Emitter; 0 to 30 minutes (1/2-Life = 30.03 yr).



Activity (Curie) vs. Time (yr)

Fig. 2 Beta activity produced by 1 Curie of Cs-137; 0 to 30 yr (1/2-Life = 30.03 yr).

Table B: Radioactivity & atomic energy 1-Curie of 30-minute old C-137

ID	Nuclides	Half-Life	Decay Modes	N (Atoms)	Mass (g)	Mass Fractions	A (Ci)	A/ Aparent	A _α (Ci)	A _β (Ci)	Energy (J)
1	55 Cs137	30.04 y	β ⁻ ; β ⁻	5.06e+19	0.0115	1.00	1.00	1.00	0	1.00	5.88
2	56 Ba137 m	2.552 m	IT	7.71e+12	1.75e-9	1.52e-7	0.944	0.944	0	0	5.85
3	56 Ba137	Stable		5.89e+13	1.34e-8	1.16e-6	0	0	0	0	0
Total: 3				5.06e+19	0.0115	1.00	1.94	1.94	0	1.00	11.7

Table C: Falsified Gross Beta test results from the 2002 Water Quality Report; Table 31 @ <http://www.gfxtechnology.com/Radon.html> [1] [2]

Component	Low Value	High Value	Avg. Value	Number of Tests
Gross Alpha Activity pCi/l	ND	1.5	ND	9
Gross Beta Activity pCi/l	ND	2.0	ND	9
Cesium-137 pCi/l	ND	10.1	ND	9
Lead-210 pCi/l	ND	ND	ND	9
Radon	NA	NA	NA	0

NOTES

[1] Tables A & Fig. 1 indicate the total Beta Activity produced by one Curie of Cs-137 grows to 1.94 Curies within 20 minutes of being dissolved in water. Table B & Fig. 2 show it takes about 30 years for the total Beta activity to reach the initial activity of Cs-137. Therefore, the Gross Beta activity reported by the SCWA should have been between 10.1 & 19.6 pCi/L -- not 2.0 pCi/L.

[2] The SCWA's RAILROAD AVE well field is located south of the BNL & Grumman Superfund sites. It had 2 wells #S-32359, S-81473 located in Center Moriches in 2001; SCWA Distribution Area # 20 in 2002 serving: Mastic, Mastic Beach, Moriches, North Shirley, Ridge, Shoreham, South Manor, South Ridge & Westhampton Beach with radioactive water.



Distribution Area 20				
Range of Readings				
	Low Value	High Value	Avg. Value	No. of Tests
Gross Alpha activity pCi/l	ND	4.0	ND	59
Gross Beta activity pCi/l	ND	5.1	ND	59
Cesium-137 pCi/l	ND	10.1	ND	53
Lead-210 pCi/l	ND	1080	20.8	53
Radon pCi/l	ND	232	ND	50

Table D: Excerpt from the fraudulent 2003 water quality report from the Suffolk County Water Authority (SCWA) @ <http://gfxtechnology.com/WQR-03.pdf>.

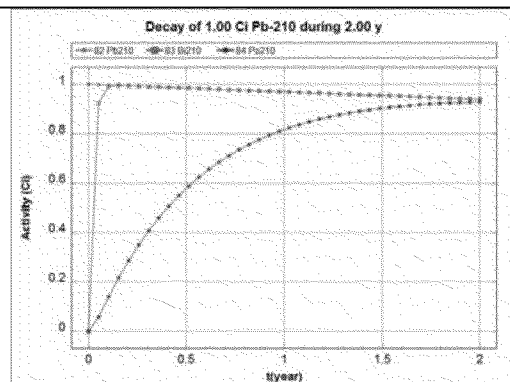
Additional Proof of Fraud

(Added 12/17/16)

[3] Table D & Fig. 3 contain proof that the EPA approved a water quality report submitted by the SCWA that contained numerous fraudulent entries, such as: (a) a false High Value of Gross Beta activity of only 5.1, when it should have been at least 2,643 pCi/L from Cs-137, Ba-137m, Pb-210, Pb-214, Bi-210, Bi-214 and (b) a false High Value of Gross Alpha activity of only 4.0 pCi/L when it should have been at least 1,776 pCi/L Rn-222, Po-210, Po-214 & Po-218 -- far above the 15 pCi/L Gross Alpha MCL.

[4] Application of the EPA's the Sum-of-the Fractions method for 10.1 pCi/L of Cs-137, 1,080 pCi/L of Pb-210 alone yields an annual dose of $4[(10.1/200)+(1080/1.2)] = 3,600$ mrem; far above the Gross Beta MCL of 4mrem -- excluding doses from Ba-137m, Pb-214, Bi-210 & Bi-214. Yet the SCWA wrote "NYS considers 50 pCi/L of gross beta activity to be the level of concern for gross beta." (Quote from pg. 19 or the 2016 Water Quality report @ <http://s1091480.instanturl.net/dwqr2016/2016 DWQR FINAL 5-31-16.pdf>)

*** Table MW2. Radionuclides in On-Site Monitoring Wells in the BNL Health Assessment indicates the conversion factor for Beta/Photon particles emitted by Ra-226 & Pb-210 are about 3 & 1.2 pCi/4mrem.



Activity from Pb-210, Bi-210 & Po-210 (Ci) vs. Time (yr)

Fig. 3 Graph of Alpha & Beta activity produced by 1 Curie of Pb-210. (from www.gfxtechnology.com/1-Ci.pdf)